

5. Gestational Diabetes

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During pregnancy there are many changes that take place in the mother's metabolism—a rise in insulin resistance is one of these changes.

The placenta supplies a growing fetus with nutrients and produces a variety of hormones to maintain the pregnancy. Some of these hormones, such as human placental lactogen, have a blocking effect on insulin that usually begins 20 to 24 weeks into the pregnancy. The contra-insulin effect of placental hormones leads to higher levels of maternal blood glucose after eating (post-prandial levels) that may aid fetal growth.

Normally, the mother's beta cells can produce additional insulin to overcome the insulin resistance of pregnancy. As the placenta grows, more hormones are produced, and insulin resistance becomes greater. When the mother's production of insulin is not enough to overcome the effect of the placental hormones, gestational diabetes mellitus (GDM) results. GDM is defined as "carbohydrate intolerance of varying degrees of severity with onset or first recognition during pregnancy" (1). GDM complicates 7% of all pregnancies in the United States (2) and is more common in populations with a higher rate of type 2 diabetes mellitus, such as African Americans, Asian Americans, Hispanic Americans, and Native Americans (3, 4).

The main complications of GDM are increased fetal size, which may complicate delivery, and hypoglycemia in the baby immediately after delivery. Women with GDM generally have normal blood sugar levels during the critical first trimester (before the 13th week) of pregnancy. This is in contrast to patients with type 1 diabetes, where hyperglycemia in this period may cause congenital birth defects.

After a positive screening test, the diagnosis of GDM is made by a glucose tolerance test. In this test, a sugary drink is given, and a series of blood tests are taken at set time intervals (Table 1). If hyperglycemia is detected, treatment begins with a change in diet and an increase in exercise. If these lifestyle changes fail to control blood glucose levels, insulin therapy is started.

Women with pre-existing diabetes require higher doses of insulin during pregnancy because of the increase in insulin resistance. If their diabetes is usually controlled using oral hypoglycemic agents, they are usually transferred to insulin to enable better glucose control and because the safety of most hypoglycemic agents has not been studied in pregnancy.

GDM can disappear within hours of giving birth, depending on individual factors such as beta cell function and predisposing factors such as obesity. However, a significant portion of women go on to develop type 2 diabetes. Because GDM and type 2 diabetes both feature insulin resistance and share risk factors such as obesity, it is possible that these two conditions may also share diabetes susceptibility genes.

References

1. Metzger BE, Coustan DR *et al.* Summary and recommendations of the Fourth International Workshop-Conference on gestational diabetes mellitus. *Diabetes Care* 21 (suppl2):B161–B167; 1998. (PubMed)
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Table 1. Diagnosis of gestational diabetes.

	mg/dl	mmol/l
Glucose load, 100 g		
Fasting	95	5.3
1 hour	180	10.0
2 hours	155	8.6
3 hours	140	7.8
Glucose load, 75 g		
Fasting	95	5.3
1 hour	180	10.0
2 hours	155	8.6

Gestational diabetes can be diagnosed using either a 100-g or 75-g oral glucose load. Two or more of the venous plasma glucose concentrations must be met or exceeded for a positive diagnosis. The test should be done in the morning after an overnight fast.